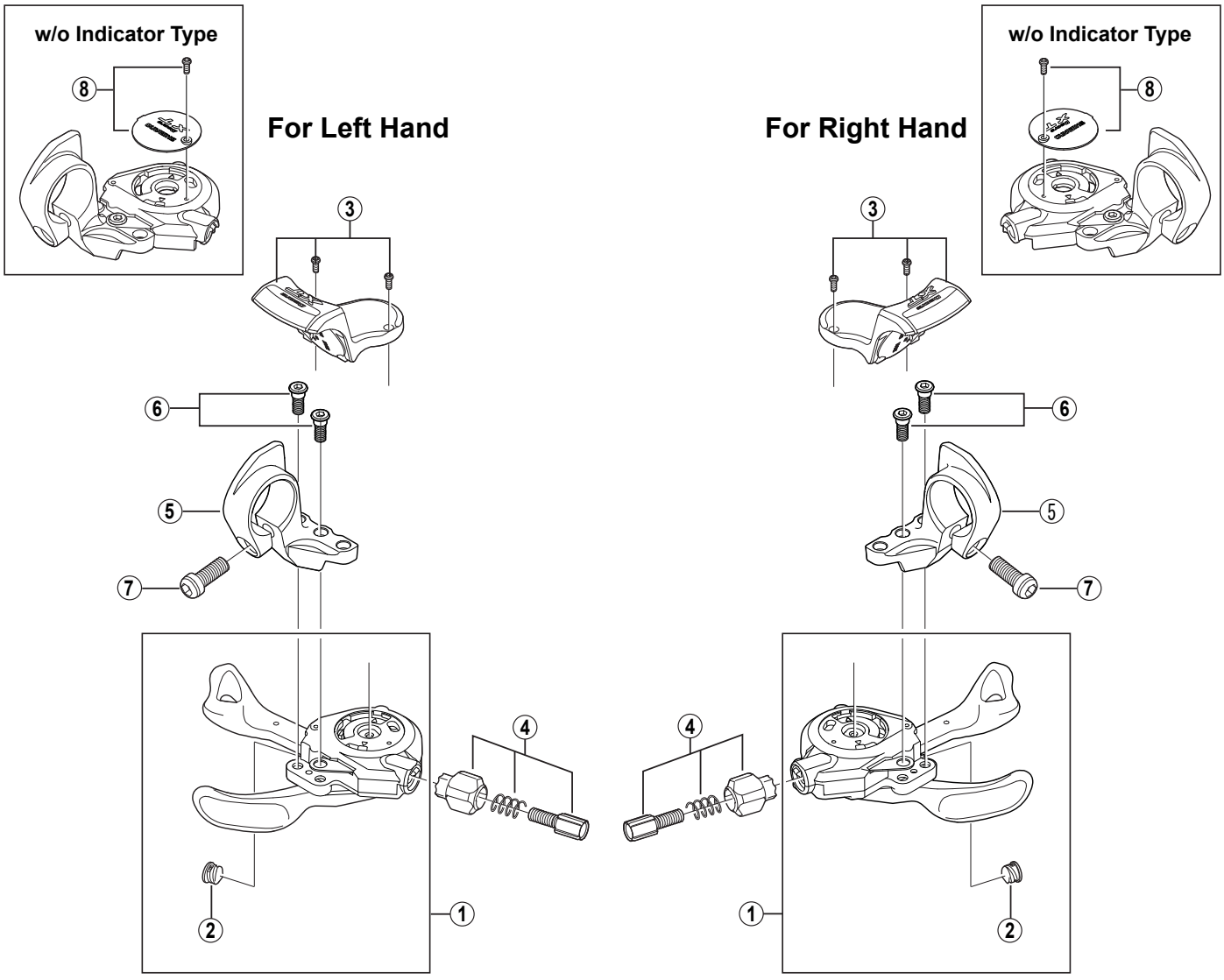
DEORE XT Mega-9 Rapidfire Lever

SL-M770



ITEM NO.	SHIMANO CODE NO.	DESCRIPTION	INTERCHANGE-ABILITY		
			SL-M970	SL-M760	SL-M952
1	**Y-6MP98010**	R.H. Shifting Lever Unit			
	Y-6MP98020	L.H. Shifting Lever Unit			
2	**Y-6CD33000**	Inner Hole Cap	A	A	A
3	**Y-6MP98030**	R.H. Indicator Unit			
	Y-6MP98040	L.H. Indicator Unit			
* 4	**Y-6GR98090**	R.H. Cable Adjustting Bolt Unit	B	B	B
	Y-6MP98070	L.H. Cable Adjustting Bolt Unit	B	B	B
5	**Y-6MP01000**	R.H. Bracket			
	Y-6NX51000	L.H. Bracket			
* 6	**Y-6MP98080**	SL Fixing Bolt (M4) 2pcs.			
7	**Y-8U9 14000**	Clamp Bolt (M6 x 15)		B	B
* 8	**Y-6MP98090**	R.H. Base Hole Cap & Bolt Unit			
*	**Y-6MP98100**	L.H. Base Hole Cap & Bolt Unit			

A: Same parts.
B: Parts are usable, but differ in materirals, appearance, finish, size, etc.
Absence of mark indicates non-interchangeability.

0707-2708A

Specifications are subject to change without notice.

SHIMANO

SI-6MPFA-003-00

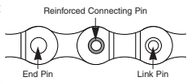
General Safety Information

⚠ WARNING

- Use neutral detergent to clean the chain. Do not use alkali-based or acid based detergent such as rust cleaners as it may result in damage and/or failure of the chain.
- Use the reinforced connecting pin only for connecting the narrow type of chain.
- There are two different types of reinforced connecting pins available. Be sure to check the table below before selecting which pin to use.
  If connecting pins other than reinforced connecting pins are used, or if a reinforced connecting pin or tool which is not suitable for the type of chain is used, sufficient connection force may not be obtained, which could cause the chain to break or fall off.

Chain	Reinforced connecting pin	Chain tool
9-speed super narrow chain such as CN-7701 / CN-HG93	6.5mm Silver	TL-CN32 / TL-CN27
8-/7-/6-speed narrow chain such as CN-HG50 / CN-HG40	7.1mm Black	TL-CN32 / TL-CN27

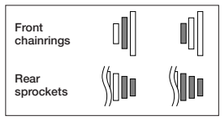
- If it is necessary to adjust the length of the chain due to a change in the number of sprocket teeth, make the cut at some other place than the place where the chain has been joined using a reinforced connecting pin or an end pin. The chain will be damaged if it is cut at a place where it has been joined with a reinforced connecting pin or an end pin.



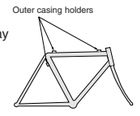
- Be careful not to let the cuffs of your clothes get caught in the chain while riding, otherwise you may fall off the bicycle.
- Check that the tension of the chain is correct and that the chain is not damaged. If the tension is too weak or the chain is damaged, the chain should be replaced. If this is not done, the chain may break and cause serious injury.
- Use a front chainwheel which is compatible with 9-speed chains in conjunction with Shimano CN-7701, CN-HG93 and CN-HG73 chains. If a chainwheel for an 8-speed chain or less is used, front chainwheel gear shifting problems may occur, or the chain pins might fall out, causing the chain to break.
- The two left crank arm mounting bolts should be tightened alternately in stages rather than each bolt being fully tightened all at once. Use a torque wrench to check that the final tightening torques are within the range of 12 - 14 N·m.
  Furthermore, after riding approximately 100 km (60 miles), use a torque wrench to re-check the tightening torques.
  It is also important to periodically check the tightening torques.
  If the tightening torques are too weak or if the mounting bolts are not tightened alternately in stages, the left crank arm may come off and the bicycle may fall over, and serious injury may occur as a result.
- Check that there are no cracks in the crank arms before riding the bicycle. If there are any cracks, the crank arm may break and you may fall off the bicycle.
- If the inner cover is not installed correctly, the axle may rust and become damaged, and the bicycle may fall over and serious injury may occur as a result.
- **Obtain and read the service instructions carefully prior to installing the parts.** Loose, worn or damaged parts may cause the bicycle to fall over and serious injury may occur as a result. We strongly recommend only using genuine Shimano replacement parts.
- **Obtain and read the service instructions carefully prior to installing the parts.** If adjustments are not carried out correctly, the chain may come off and this may cause you to fall off the bicycle which could result in serious injury.
- Read these Technical Service Instructions carefully, and keep them in a safe place for later reference.

Note

- In addition, if pedaling performance does not feel normal, check this once more.
- Before riding the bicycle, check that there is no play or looseness in the connection. Also, be sure to retighten the crank arms and pedals at periodic intervals.
- If a squeaking noise is heard coming from the bottom bracket axle and the left crank arm connector, apply grease to the connector and then tighten it to the specified torque.
- Do not wash the bottom bracket with high-pressure jets of water.
- If you feel any looseness in the bearings, the bottom bracket should be replaced.
- If gear shifting operations do not feel smooth, wash the derailleur and lubricate all moving parts.
- If the amount of looseness in the links is so great that adjustment is not possible, you should replace the derailleur.
- You should periodically wash the chainrings in a neutral detergent and then lubricate them again. In addition, cleaning the chain with neutral detergent and lubricating it can be an effective way of extending the useful life of the chainrings and the chain.
- If the chain keeps coming off the chainrings during use, replace the chainrings and the chain.
- When the chain is in the position shown in the illustration, the chain may contact the front chainrings or front derailleur and generate noise. If the noise is a problem, shift the chain onto the next-larger rear sprocket or the one after.



- Apply grease to the left and right adapters before installing them.
- For smooth operation, use the specified outer casing and the bottom bracket cable guide.
- This front derailleur is for triple front chainwheel use only. It cannot be used with the double front chainwheel, as the shifting points do not match.
- When installing the top route type, choose a frame that has three outer casing holders as shown in the illustration at right.



- Use an outer casing which still has some length to spare even when the handlebars are turned all the way to both sides. Furthermore, check that the shifting lever does not touch the bicycle frame when the handlebars are turned all the way.
- A special grease is used for the gear shifting cable (SIS-SP41). Do not use DURA-ACE grease or other types of grease, otherwise they may cause deterioration in gear shifting performance.
- Grease the inner cable and the inside of the outer casing before use to ensure that they slide properly.
- Operation of the levers related to gear shifting should be made only when the front chainwheel is turning.
- If the brake fluid used in the oil disc brakes is of a type which tends to adhere to the plastic parts of the shifting lever, this may cause the plastic parts to crack or become discolored. Therefore, you should make sure that the brake fluid does not adhere to these plastic parts.
  The mineral oil which is used in SHIMANO disc brakes does not cause cracking or discoloration if it adheres to plastic parts, but such parts should be cleaned with alcohol beforehand to prevent foreign particles from adhering.
- Do not disassemble the indicator and shifting lever unit, as this may damage them or cause mis-operation.
- Parts are not guaranteed against natural wear or deterioration resulting from normal use.
- For maximum performance we highly recommend Shimano lubricants and maintenance products
- For any questions regarding methods of installation, adjustment, maintenance or operation, please contact a professional bicycle dealer.

Technical Service Instructions SI-6MPFA-003

Front Drive System

In order to realize the best performance, we recommend that the following combination be used.

Series	XT
Rapidfire (Shifting lever)	SL-M770
Outer casing	SIS-SP41
Front derailleur	FD-M770 / FD-M771 / FD-M772 / FD-M773 / FD-M770-E / FD-M772A
Front chainwheel	FC-M770 / FC-M771-K
Chain	CN-HG93
Bottom bracket cable guide	SM-SP17 / SM-BT17

This service instruction explains how to use and maintain the Shimano bicycle parts which have been used on your new bicycle. For any questions regarding your bicycle or other matters which are not related to Shimano parts, please contact the place of purchase or the bicycle manufacturer.

SHIMANO

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* Service Instructions in further languages are available at :
http://techdocs.shimano.com

Please note: specifications are subject to change for improvement without notice. (English)
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Specifications

Front Derailleur

X = Available

Model number	FD-M770-E	FD-M770	FD-M771	FD-M772 / M772A FD-M773
Normal type	X	X	X	X
Top route type	X	X	X	X
Front chainwheel tooth difference	22T	22T	22T	22T
Min. difference between top and intermediate	12T	12T	12T	12T
Front derailleur installation band diameter	–	S, M, L	S, M, L	S, M, L
Chainstay angle (α)	66° - 69°	66° - 69°	66° - 69°	63° - 66°
Applicable chain line	50 mm	50 mm	50 mm	50 mm
Applicable front chainwheel	44T	44T / 48T	44T	44T / 48T

Installation band diameters:
S (28.6 mm), M (31.8 mm), L (34.9 mm)

When using the S, M size, use an installation band with a diameter of 28.6 mm, 31.8mm and install it to a L size adapter.

Chainwheel

Model number	FC-M770	FC-M771-K
Chainwheel tooth combination	44-32-22T	48-36-26T
Bolt circle diameter	104 mm / 64 mm	104 mm / 64 mm
Crank arm length	165 mm, 170 mm, 175 mm, 180 mm	165 mm, 170 mm, 175 mm, 180 mm
Chain line	50 mm	50 mm
Bottom bracket shell width	68, 73 mm	68, 73 mm
Thread dimensions	BC1.37 (68, 73mm)	BC1.37 (68, 73mm)
Applicable bottom bracket	SM-BB70	

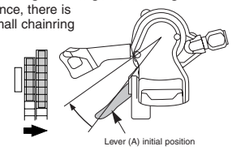
Gear shifting operation

This release lever is equipped with a 2-way release mechanism which allows release operations to be carried out by either pushing or pulling the lever.
Both lever (A) and lever (B) always return to the initial position when they are released after shifting.
When operating one of the levers, always be sure to turn the crank arm at the same time.

To shift from a small chainring to a larger chainring

When lever (A) is pressed once, there is a shift of one step from a small chainring to a larger chainring.

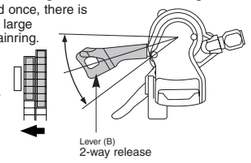
Example:
from intermediate chainring to largest chainring.



To shift from a large chainring to a smaller chainring

When lever (B) is pressed once, there is a shift of one step from a large chainring to a smaller chainring.

Example:
from largest chainring to intermediate chainring.



Installation of the Front Chainwheel and Front Derailleur

Follow the procedure in the figure.

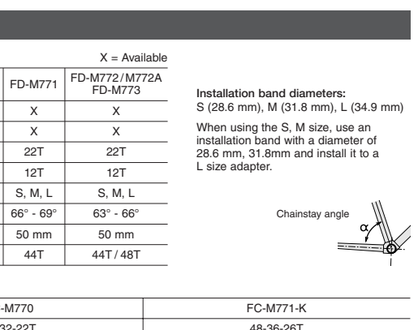
1, 2 Use the special tool TL-FC32/36 to install the right adapter (counterclockwise thread) and the left adapter (clockwise thread).
Tightening torque: 35 - 50 N·m {305 - 435 in. lbs.}

3 Insert the right crank unit.

4 Set section A of the left crank into the axle of the right crank unit where the groove is wide.

5 Use the TL-FC16/18 to tighten the cap.
Tightening torque: 0.7 - 1.5 N·m {6 - 13 in. lbs.}

6 Push in the stopper plate and check that the plate pin is securely in place, and then tighten the bolt of the left crank arm. (5 mm Allen key)
Note : Each of the bolts should be evenly and equally tightened to 12 - 14 N·m {106 - 122 in. lbs.}.



Note :
Set the stopper plate in the right direction as shown in illustration.

■ Spacer installation method

(1) Check whether the width of the bottom bracket shell is 68 mm or 73 mm.
(2) Next, install the adapter while referring to the illustrations below.

Spacer
Ⓐ 2.5 mm | Ⓑ 1.8 mm | Ⓒ 0.7 mm

< FC-M770 >

Band Type	Bracket Type
68 mm	68 mm, BB mount-type bracket
73 mm	73 mm

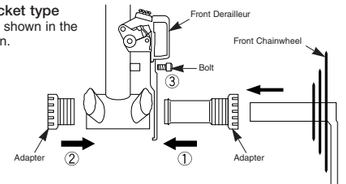
< FC-M771-K >

Band Type	Chaincase Stay Type	Bracket Type
68 mm *1	68 mm *2 Chaincase stay	68 mm, BB mount-type bracket
73 mm	73 mm	73 mm

*1 If using three 2.5 mm spacers with a band type and a bottom bracket shell having a width of 68 mm, install the three spacers so that there are two on the right and one on the left.
*2 1.8 mm corresponds to the thickness of the chain case.

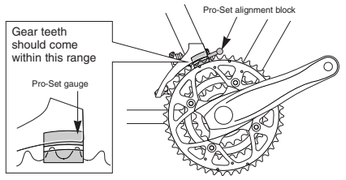
For bracket type

Install as shown in the illustration.



Tightening torque :
35 - 50 N·m {305 - 435 in. lbs.}

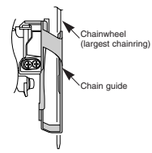
Adjust and then install the front derailleur as shown in the illustration. Do not remove the Pro-Set alignment block at this time.



■ Note

When installing the components to carbon frame/handle bar surfaces, verify with the manufacturer of the carbon frame/parts for their recommendation on tightening torque in order to prevent over tightening that can cause damage to the carbon material and/or under tightening that can cause lack of fixing strength for the components.

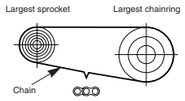
The level section of the chain guide outer plate should be directly above and parallel to the largest chainring. Secure using a 5 mm Allen key.



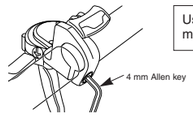
Tightening torque :
5 - 7 N·m {44 - 60 in. lbs.}

Chain length

Add 2 links (with the chain on both the largest sprocket and the largest chainring)



Installation of the lever



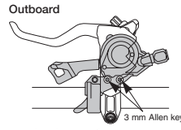
Use a handlebar grip with a maximum outer diameter of 36 mm.

Tightening torque :
5 N·m {44 in. lbs.}

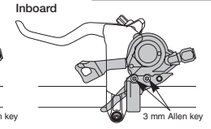
If not using the indicator, this shifting lever can be installed either on the inside or the outside of the brake lever.
If adjusting the position, remove the indicator, and then be sure to secure it in the new position with the two fixing bolts.

Tightening torque :
2.5 N·m {22 in. lbs.}

Outboard



Inboard



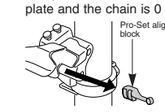
- Install the shifting lever in a position where it will not obstruct brake operation and gear shifting operation.
- Do not use in a combination which causes brake operation to be obstructed.

SIS Adjustment

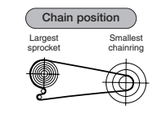
Be sure to follow the sequence described below.

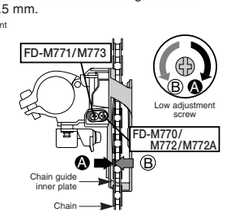
1. Low adjustment

First remove the Pro-Set alignment block .
Next, set so that the clearance between the chain guide inner plate and the chain is 0 - 0.5 mm.



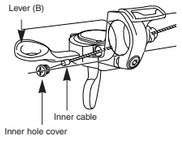
Chain position



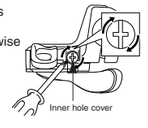


2. Connecting and securing the inner cable

Operate lever (B) two times or more, and check on the indicator that the lever is at the lowest position. Then remove the inner hole cover and connect the inner cable.



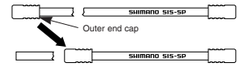
Install the inner hole cover by turning it as shown in the illustration until it stops.
Do not turn it any further than this, otherwise it may damage the screw thread.



Cutting the outer casing

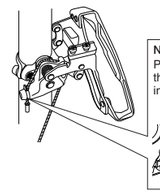
When cutting the outer casing, cut the opposite end to the end with the marking. After cutting the outer casing, make the end round so that the inside of the hole has a uniform diameter.

Attach the same outer end cap to the cut end of the outer casing.

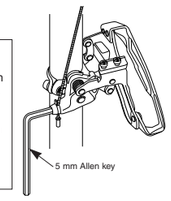


• FD-M770/FD-M772/FD-M772A

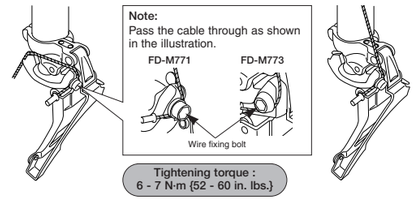
< Normal type >



< Top route type >

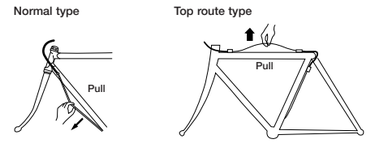


• FD-M771/FD-M773



Tightening torque :
6 - 7 N·m {52 - 60 in. lbs.}

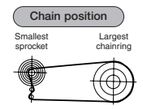
After taking up the initial slack in the cable, re-secure to the front derailleur as shown in the illustration.

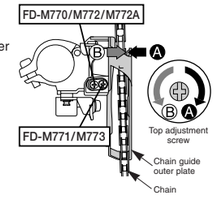


3. Top adjustment

Set so that the clearance between the chain guide outer plate and the chain is 0 - 0.5 mm.

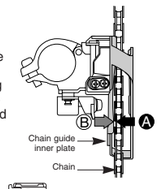
Chain position



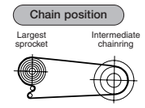


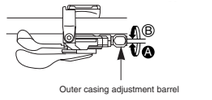
4. Adjustment of the intermediate chainring

When carrying out adjustment, set the chain to the largest sprocket, and at the front, set the chain to the intermediate chainring. Adjust using the outer casing adjustment barrel so that the clearance between the chain guide inner plate and the chain is 0 - 0.5 mm.



Chain position





5. Troubleshooting chart

After completion of steps 1 - 4, move the shifting lever to check the shifting. (This also applies if shifting becomes difficult during use.)

If the chain falls to the crank side.	Tighten the top adjustment screw clockwise (about 1/4 turn).
If shifting is difficult from the intermediate chainring to the largest chainring.	Loosen the top adjustment screw counterclockwise (about 1/8 turn).
If shifting is difficult from the intermediate chainring to the smallest chainring.	Loosen the low adjustment screw counterclockwise (about 1/4 turn).
If there is interference between the chain and the front derailleur inner plate at the largest chainring.	Tighten the top adjustment screw clockwise (about 1/8 turn).
If there is interference between the chain and the front derailleur outer plate at the largest chainring.	Loosen the top adjustment screw counterclockwise (about 1/8 turn).
If the intermediate chainring is skipped when shifting from the largest chainring.	Loosen the outer casing adjustment barrel counterclockwise (1 or 2 turns).
If there is interference between the chain and front derailleur inner plate when the rear sprocket is shifted to the largest sprocket when the chainwheel is at the intermediate chainring position.	Tighten the outer casing adjustment barrel clockwise (1 or 2 turns).
If the chain falls to the bottom bracket side.	Tighten the low adjustment screw clockwise (about 1/2 turn).
If the lever is stiff when shifting from the intermediate chainring to the largest chainring	Loosen the top adjustment screw counterclockwise (about 1/4 turn).

■ **Refer to the Service Instructions for the Rear Drive System for details on replacing and installing the indicator unit.**

SI-6MPRA-001-00

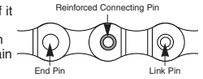
General Safety Information

⚠ WARNING

- Check that the wheels are fastened securely before riding the bicycle. If the wheels are loose in any way, they may come off the bicycle and serious injury may result.
- Use neutral detergent to clean the chain. Do not use alkali-based or acid based detergent such as rust cleaners as it may result in damage and/or failure of the chain.
- Use the reinforced connecting pin only for connecting the narrow type of chain.
- There are two different types of reinforced connecting pins available. Be sure to check the table below before selecting which pin to use.
  If connecting pins other than reinforced connecting pins are used, or if a reinforced connecting pin or tool which is not suitable for the type of chain is used, sufficient connection force may not be obtained, which could cause the chain to break or fall off.

Chain	Reinforced connecting pin	Chain tool
9-speed super narrow chain such as CN-7701 / CN-HG93	6.5mm Silver	TL-CN32 / TL-CN27
8-/7-/6-speed narrow chain such as CN-HG50 / CN-HG40	7.1mm Black	TL-CN32 / TL-CN27

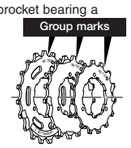
- If it is necessary to adjust the length of the chain due to a change in the number of sprocket teeth, make the cut at some other place than the place where the chain has been joined using a reinforced connecting pin or an end pin. The chain will be damaged if it is cut at a place where it has been joined with a reinforced connecting pin or an end pin.



- Check that the tension of the chain is correct and that the chain is not damaged. If the tension is too weak or the chain is damaged, the chain should be replaced. If this is not done, the chain may break and cause serious injury.
- Use a front chainwheel which is compatible with 9-speed chains in conjunction with Shimano CN-7701, CN-HG93 and CN-HG73 chains. If a chainwheel for an 8-speed chain or less is used, front chainwheel gear shifting problems may occur, or the chain pins might fall out, causing the chain to break.
- **Obtain and read the service instructions carefully prior to installing the parts.** Loose, worn or damaged parts may cause the bicycle to fall over and serious injury may occur as a result. We strongly recommend only using genuine Shimano replacement parts.
- **Obtain and read the service instructions carefully prior to installing the parts.** If adjustments are not carried out correctly, the chain may come off and this may cause you to fall off the bicycle which could result in serious injury.
- Read these Technical Service Instructions carefully, and keep them in a safe place for later reference.

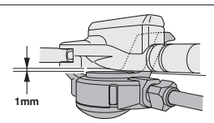
Note

- If gear shifting operations do not feel smooth, wash the derailleur and lubricate all moving parts.
- If the amount of looseness in the links is so great that adjustment is not possible, you should replace the derailleur.
- You should periodically clean the derailleur and lubricate all moving parts (mechanism and pulleys).
- If gear shifting adjustment cannot be carried out, check the degree of parallelism at the rear end of the bicycle. Also check if the cable is lubricated and if the outer casing is too long or too short.
- If you hear abnormal noise as a result of looseness in a pulley, you should replace the pulley.
- If the wheel becomes stiff and difficult to turn, you should lubricate it with grease.
- Do not apply any oil to the inside of the hub, otherwise the grease will come out.
- You should periodically wash the sprockets in a neutral detergent and then lubricate them again. In addition, cleaning the chain with neutral detergent and lubricating it can be a effective way of extending the useful life of the sprockets and the chain.
- If the chain keeps coming off the sprockets during use, replace the sprockets and the chain.
- Use a frame with internal cable routing is strongly discouraged as it has tendencies to impair the SIS shifting function due to its high cable resistance.
- Always be sure to use the sprocket set bearing the same group marks. Never use in combination with a sprocket bearing a different group mark.



- Use an outer casing which still has some length to spare even when the handlebars are turned all the way to both sides. Furthermore, check that the shifting lever does not touch the bicycle frame when the handlebars are turned all the way.
- A special grease is used for the gear shifting cable (SIS-SP41). Do not use DURA-ACE grease or other types of grease, otherwise they may cause deterioration in gear shifting performance.
- Grease the inner cable and the inside of the outer casing before use to ensure that they slide properly.
- For smooth operation, use the specified outer casing and the bottom bracket cable guide.
- Operation of the levers related to gear shifting should be made only when the front chainwheel is turning.
- If the brake fluid used in the oil disc brakes is of a type which tends to adhere to the plastic parts of the shifting lever, this may cause the plastic parts to crack or become discolored. Therefore, you should make sure that the brake fluid does not adhere to these plastic parts.
  The mineral oil which is used in SHIMANO disc brakes does not cause cracking or discoloration if it adheres to plastic parts, but such parts should be cleaned with alcohol beforehand to prevent foreign particles from adhering.
- Do not disassemble the indicator and shifting lever unit, as this may damage them or cause mis-operation.
- Parts are not guaranteed against natural wear or deterioration resulting from normal use.
- For maximum performance we highly recommend Shimano lubricants and maintenance products
- For any questions regarding methods of installation, adjustment, maintenance or operation, please contact a professional bicycle dealer.

Do not push the brake lever against the indicator cover, otherwise it may cause problems with the operation of the needle.



Technical Service Instructions SI-6MPRA-003

Rear Drive System

In order to realize the best performance, we recommend that the following combination be used.

Series	XT
RAPIDFIRE (Shifting lever)	SL-M770
Outer casing	SIS-SP41
Rear derailleur	RD-M771
Type	SGS / GS
Freehub	FH-M770 / FH-M775
Gears	9
Cassette sprocket	CS-M770
Chain	CN-HG93
Bottom bracket guide	SM-SP17 / SM-BT17

This service instruction explains how to use and maintain the Shimano bicycle parts which have been used on your new bicycle. For any questions regarding your bicycle or other matters which are not related to Shimano parts, please contact the place of purchase or the bicycle manufacturer.

SHIMANO

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One Holland, Irvine, California 92618, U.S.A. Phone: +1-949-951-5003

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SHIMANO INC.
3-77 Oimatsu-cho, Sakai-ku, Sakai-shi, Osaka 590-8577, Japan

* Service Instructions in further languages are available at : **http://techdocs.shimano.com**

Please note: specifications are subject to change for improvement without notice. (English) © May 2009 by Shimano Inc. XBC SZK Printed in Japan.

Specifications

Rear Derailleur

Model number	RD-M771	
Type	SGS	GS
Gears	9	
Total capacity	45T	33T
Largest sprocket	34T	34T
Smallest sprocket	11T	11T
Front chainwheel tooth difference	22T	22T

Cassette sprocket tooth combination

Model number	Group name	Gears	Tooth combination
CS-M770	**aq**	9	11, 12, 14, 16, 18, 21, 24, 28, 32T
	as	9	11, 13, 15, 17, 20, 23, 26, 30, 34T

Freehub

Model number	FH-M770 / FH-M775
Gears	9
No. of spoke holes	36 / 32

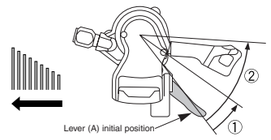
These Service Instructions describe the operation method when using the RAPIDFIRE SL-M770 in combination with the RD-M771 top normal-type rear derailleur. If using in combination with the RD-M770 reverse spring-type derailleur, the operations and indicator displays will be reversed.

Gear shifting operation

This release lever is equipped with a 2-way release mechanism which allows release operations to be carried out by either pushing or pulling the lever.
Both lever (A) and lever (B) always return to the initial position when they are released after shifting. When operating one of the levers, always be sure to turn the crank arm at the same time.

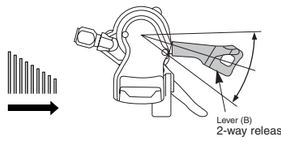
To shift from a small sprocket to a larger sprocket (Lever A)

To shift one step only, press lever (A) to the (1) position. To shift two steps at one time, press to the (2) position.



To shift from a large sprocket to a smaller sprocket (Lever B)

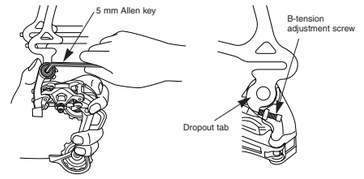
Press lever (B) once to shift one step from a larger to a smaller sprocket.



Installation of the rear derailleur

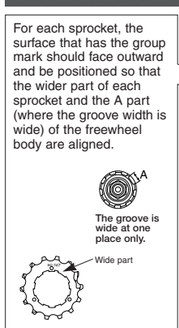
When installing, be careful not to let the B-tension adjustment screw come into contact with the dropout tab, otherwise deformation may result.

Bracket spindle Tightening torque : 8 - 10 N·m {70 - 86 in. lbs.}

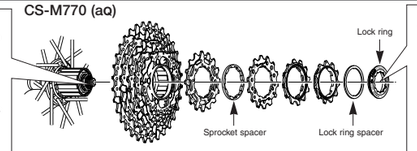


Installation of the sprockets

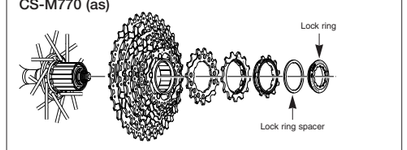
For each sprocket, the surface that has the group mark should face outward and be positioned so that the wider part of each sprocket and the A part (where the groove width is wide) of the freewheel body are aligned.



CS-M770 (aq)



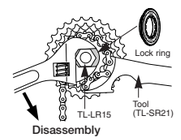
CS-M770 (as)



- For installation of the sprockets, use the special tool (TL-LR15) to tighten the lock ring.

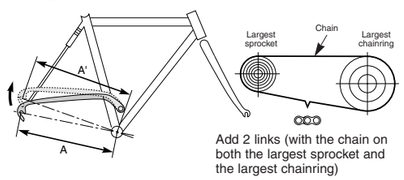
Tightening torque: 30 - 50 N·m {261 - 434 in. lbs.}

- To replace the sprockets, use the special tool (TL-LR15) and TL-SR21 to remove the lock ring.



Chain length on bicycles with rear suspension

The length of A will vary depending on the movement of the rear suspension. Because of this, an excessive load may be placed on the drive system if the chain length is too short. Set the length of the chain by adding two links to the chain when the rear suspension is at a position where dimension "A" is longest and the chain is on the largest sprocket and the largest chainring. If the amount of movement of the rear suspension is large, the slack in the chain may not be taken up properly when the chain is on the smallest chainring and smallest sprocket.

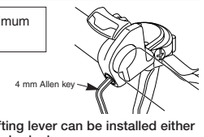


Add 2 links (with the chain on both the largest sprocket and the largest chainring)

Installation of the lever

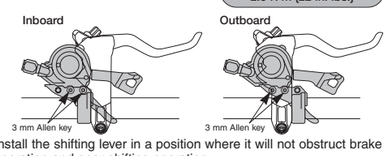
Use a handlebar grip with a maximum outer diameter of 36 mm.

Tightening torque : 5 N·m {44 in. lbs.}



If not using the indicator, this shifting lever can be installed either on the inside or the outside of the brake lever.
If adjusting the position, remove the indicator, and then be sure to secure it in the new position with the two fixing bolts.

Tightening torque : 2.5 N·m {22 in. lbs.}



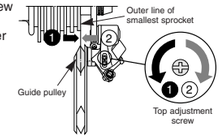
- Install the shifting lever in a position where it will not obstruct brake operation and gear shifting operation.
- Do not use in a combination which causes brake operation to be obstructed.

- When installing the components to carbon frame/handle bar surfaces, verify with the manufacturer of the carbon frame/parts for their recommendation on tightening torque in order to prevent over tightening that can cause damage to the carbon material and/or under tightening that can cause lack of fixing strength for the components.

SIS Adjustment

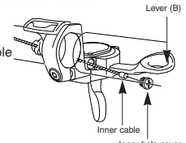
1. Top adjustment

Turn the top adjustment screw to adjust so that the guide pulley is in line with the outer line of the smallest sprocket when looking from the rear.

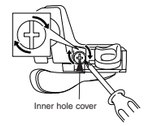


2. Connection and securing of the inner cable

Operate lever (B) eight times or more, and check on the indicator that the lever is at the highest position. Then remove the inner hole cover and connect the inner cable.

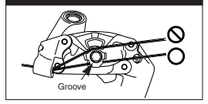


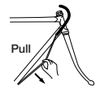
Install the inner hole cover by turning it as shown in the illustration until it stops. Do not turn it any further than this, otherwise it may damage the screw thread.



Connect the cable to the rear derailleur and, after taking up the initial slack in the cable, re-secure to the rear derailleur as shown in the illustration.

Note: Be sure that the cable is securely in the groove.

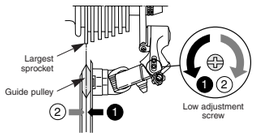




Tightening torque : 6 - 7 N·m {52 - 60 in. lbs.}

3. Low adjustment

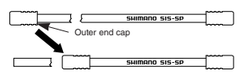
Turn the low adjustment screw so that the guide pulley moves to a position directly in line with the largest sprocket.



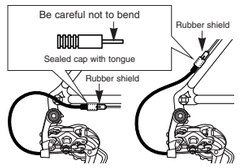
Cutting the outer casing

When cutting the outer casing, cut the opposite end to the end with the marking. After cutting the outer casing, make the end round so that the inside of the hole has a uniform diameter.

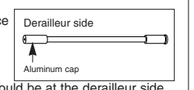
Attach the same outer end cap to the cut end of the outer casing.



The sealed cap with tongue and the rubber shield should be installed to the outer casing stopper of the frame.



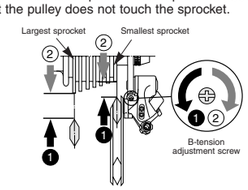
* If the rear derailleur moves to a large degree, such as in bicycles with rear suspension, it is recommended that you replace the cap with the accessory aluminum cap.



The end of the outer casing which has the aluminum cap should be at the derailleur side.

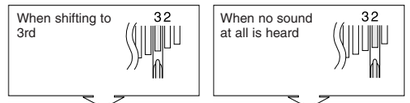
4. How to use the B-tension adjustment screw

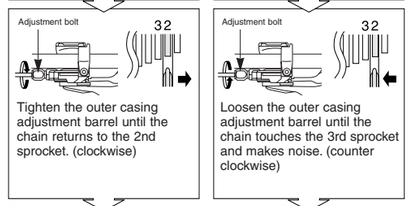
Mount the chain on the smallest chainring and the largest sprocket, and turn the crank arm backward. Then turn the B-tension adjustment screw to adjust the guide pulley as close to the sprocket as possible but not so close that it touches. Next, set the chain to the smallest sprocket and repeat the above to make sure that the pulley does not touch the sprocket.



5. SIS Adjustment

Operate the shifting lever several times to move the chain to the 2nd sprocket. Then, while pressing the lever just enough to take up the play in the lever, turn the crank arm.




Adjustment bolt
32
Tighten the outer casing adjustment barrel until the chain returns to the 2nd sprocket. (clockwise)
Adjustment bolt
32
Loosen the outer casing adjustment barrel until the chain touches the 3rd sprocket and makes noise. (counter clockwise)

Best setting

The best setting is when the shifting lever is operated just enough to take up the play and the chain touches the 3rd sprocket and makes noise.

* Return the lever to its original position (the position where the lever is at the 2nd sprocket setting and it has been released) and then turn the crank arm clockwise. If the chain is touching the 3rd sprocket and making noise, turn the outer casing adjustment barrel clockwise slightly to tighten it until the noise stops and the chain runs smoothly.

Operate lever to change gears, and check that no noise occurs in any of the gear positions.

For the best SIS performance, periodically lubricate all power-transmission parts.

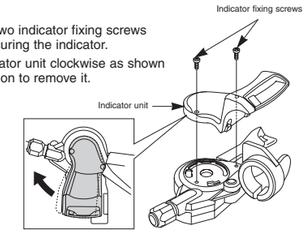
■ **Read these Service Instructions in conjunction with the Service Instructions for the FH-M770/M775.**

Replacing and installing the indicator

Disassembly and reassembly should only be carried out when removing or replacing the indicator. For the front, the direction of rotation when removing and installing is opposite to the position of the needle.

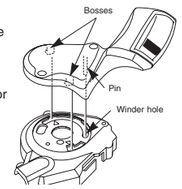
[Removal]

1. Remove the two indicator fixing screws which are securing the indicator.
2. Turn the indicator unit clockwise as shown in the illustration to remove it.

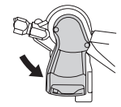


[Installation]

3. Operate lever B eight times or more to set the lever to the top position.
4. Check that the indicator needle is pointing to the left, and then insert the pin at the bottom of the indicator into the hole in the winder. Next, insert the two bosses on the indicator into the shifting lever unit so that they are aligned with the △ marks, and then turn the indicator unit counterclockwise to set it into place.



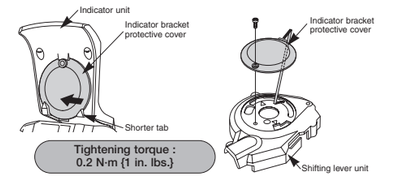
5. Turn the indicator counterclockwise, and then tighten the two indicator fixing screws.
6. Check the operation of the indicator. If it does not operate correctly, reinstall it while paying particular attention to steps 3 and 4.



Tightening torque : 0.2 N·m {1 in. lbs.}

<If not installing the indicator>

1. Remove the indicator bracket protective cover which is attached to the indicator, starting from the shorter tab as shown in the illustration.
2. First insert the tab of the indicator bracket protective cover as shown in the illustration, and then set it onto the shifting lever unit and secure it with the indicator fixing screws.



Tightening torque : 0.2 N·m {1 in. lbs.}